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DESIGNERLY WAYS OF NOT KNOWING
What designers can learn about space from people who are blind

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Abstract. This article sets out to demonstrate that architects' and other designers' visual ways of knowing may come with a considerable risk. It risks to favour visual qualities over non-visual qualities, but also cognition over embodiment in how space is understood and conceived. Their designerly ways of knowing thus may as well be viewed as designerly ways of *not* knowing—of disregarding the bodily experience of the built environment. This disregard becomes especially clear when considering the spatial experience of persons who are blind, as they are able to appreciate sounds, smells or haptic qualities designers may not be attuned to. Although the article focuses on design in architecture, it points out that the underlying rationale may be relevant for other design domains as well, including urban design.

Keywords: blindness, connoisseurship, disability, embodiment, space

1 Introduction

In an article significantly titled ‘Designerly ways of knowing’, Nigel Cross (1982) contends that design has its own distinct “things to know, ways of knowing them and ways of finding out about them.” A major goal of design research is to understand how designers think—or the nature of design expertise—and to try and establish its particular strengths and weaknesses (Cross 2006). One aspect that is said to be key to design expertise is a characteristic form of cognition, which is generally described as ‘visual thinking’.

While this ‘visual thinking’ tends to be considered in design research as a particular strength, in this article we set out to demonstrate that it may as well come with a considerable risk. To this end, we introduce the notion of expertise as connoisseurship, and adopt this notion to confront the ways in which architects know and conceive space with the spatial experience of people who are blind. Although the confrontation focuses on design in architecture, we point out that the underlying rationale may be relevant for other design domains as well, including urban design.

2 Expertise as connoisseurship

In our research, we adopt a particular view of expertise, which derives from the notion of differentiation or connoisseurship. Expertise can be developed in many domains of knowledge or skill. Moreover, several different notions

exist of what expertise is and how it develops, in line with different notions of human cognition.

One way of understanding cognition is that "people come to know what is 'out there' in the world by representing it in the mind, in the form of 'mental models'" and that "such representations are the result of a computational process working upon information received by the senses" (Ingold 2000, 163). In line with this cognitivist understanding of cognition, the traditional general-process view of expertise considers expertise as based on superiority in information processing: experts use different processes than novices or the same processes more rapidly. The more recent quantity-of-knowledge view of expertise attributes experts' performance not so much to mental processing, but rather to the fact that experts know more. Chess masters, for instance, were found to have stored in memory plenty of chunks featuring strategically significant arrangements of pieces (Chase and Simon 1973). Since then, research in cognitive science and artificial intelligence tends to explain expertise in terms of chunking: experts have larger or more chunks, or are better at recalling the right chunk at the right time.

Increasingly, however, the nature of human cognition is understood as being situated (Osbeck 2009, 17), extending the models of the cognitive processes that characterize learning, memory and intelligence from the individual brain to the surrounding social and physical environment. In line with this situated understanding of cognition, ecological psychologists

advanced the notion of expertise as differentiation or connoisseurship (Gibson and Gibson 1955; Gibson 2000). In their view, expertise develops through perceptual learning, *i.e.*, through discovering distinctive features and invariant properties of things and events. James and Eleanor Gibson (1955) explain*:* "In this theory perception gets richer in differential responses and not in images. Instead of becoming more imaginary it becomes more discriminating. Perceptual learning, then, consists of responding to variables of physical stimulation not previously responded to. The notable point about this theory is that learning is always supposed to be a matter of improvement—of getting in closer touch with the environment." As a result of this perceptual learning, experts are able to differentiate, in their body or surrounding world, variables that are meaningless to novices.

The development of differentiation or connoisseurship may be triggered by professional activities. A sommelier, for instance, is able to discern various types of bitterness in wine, which remain unnoticed to an amateur wine drinker. Yet, these types of bitterness do contribute to the taste of the wine, and thus to the pleasure it offers the amateur wine drinker. Similarly, a tailor may be able to distinguish different fabrics with the slightest touch. Designers, for their part, seem especially fluent in visual ways of knowing and thinking: designers are notoriously visually aware and sensitive. In designing architecture, for instance, the visual seems to be so

important that architecture students have been characterized as “the vis kids of architecture” (Goldschmidt 1994).

3 Designerly ways of knowing

The nature of designers’ expertise is often articulated by contrasting design with the sciences and the humanities. Unlike scientists or scholars, designers manipulate non-verbal codes in a material culture, which translate abstract requirements into concrete objects and vice-versa (Cross 1982, 2006). Whereas verbal or numeric codes facilitate analytic, problem-oriented thinking, the codes designers manipulate are said to facilitate constructive, solution-oriented thinking. Designers are immersed in this material culture which they use as a major source of ideas. They are able to both “read” and “write” in a language of objects: they understand what message objects communicate, and they can create new objects that embody new messages. In ‘reading’ and ‘writing’ in this object language, designers use models that rely heavily on graphic images (*ibid.*). In architecture and other design domains, drawings, diagrams and sketches are aids both to design thinking and to communicating ideas and instructions to others.

To start with, graphic images feature in the early, generative phase of the design process as the designer is ‘thinking with a pencil’. These so-called ‘design drawings’ are made by the designer not to communicate with others, but rather as part of the very thinking process itself which is called

design (Lawson 1997, 24). In fact, sketches and drawings seem to be so central for many designers that they are almost unable to think without a pencil in their hand (Lawson 1997, 243). In analysing this phenomenon, Suwa, Gero and Purcell (1998) distinguish three roles of sketches during design. First, sketches serve as an external memory in which designers can store their ideas as a kind of visual memories. Secondly, sketches serve as a source of visual-spatial hints for associating functional aspects. Related to this second role of sketching, Donald Schön (1983) points out that sketching helps designers to discover unforeseen consequences of their design moves, the surprises that keep the design process going. He characterizes designing as "having a reflective conversation with the situation." Thirdly, Suwa, Gero and Purcell (1998) indicate that sketches offer a physical setting in which ideas are developed.

In addition to their role in generating ideas, drawings also form the basis for evaluating a design proposal and for comparing different alternatives—both informally as designers read drawings and imagine their implications, and more formally as dimensions are measured, stresses are calculated and so on. Compared to the vernacular process, design by drawing offers the designer great manipulative freedom: part of the proposed solution can be adjusted and the implications immediately investigated without incurring the time and cost of constructing the final product (Jones 1970, referred to in Lawson 1997, 24).

Finally, drawings play a key role in the communication of a design proposal. Designers produce presentation drawings to communicate their work to clients and others, and working drawings to explain how to construct their design to manufacturers or builders.

In design research, this non-verbal thinking and communicating as it relates to design is highly valued as paramount to design expertise (see for instance Cross 1982, 2006; Schön and Wiggins 1992; Goldschmidt 1999). It is said to distinguish design from the cultures of the sciences and the humanities, and as such serves as justification for introducing design in general education: the traditional emphasis on numeracy and literacy, so it is argued, should be complemented with a third way of thinking, *i.e.* 'graphicacy' (Cross 1982, 2006).

In case of architecture, however, this 'graphicacy' is not only a particular strength, but may as well come with a considerable risk. Architectural drawings are necessarily more abstract than lived experience and so architects' involvement with space, as they conceive and represent it, is quite distant from people's experience of space as they live it (Franck and Lepori 2007). As Bryan Lawson (1997) points out, "[t]he drawings which a designer chooses to make whilst designing tend to be highly codified and rarely connect with our direct experience of the final design. Architects […] probably design most frequently with the plan, which is a very poor representation of the experience of moving around in a building." The same

holds for sections and elevations: neither are views we ever experience (Franck and Lepori 2007).

Historically, the use of plan, section and elevation was introduced in the modern period, encouraging architects to conceive of space in highly abstract terms and, compared to perspective drawings and drawings in watercolour, to pay less attention to materiality and embodiment (Franck and Lepori 2007). Today, the combined use of plan, section and elevation to represent architectural space is found to lead to a flattening or two-dimensionalization of space. Where the body is conceived of, interviews with architects and teachers in schools of architecture suggest, it is usually a body characterised by geometrical proportions arranged around precise Cartesian dimensions (Imrie 2003). Hence, Rob Imrie (2003) concludes, architects rarely relate their design conceptions to the human body and its multiple forms of embodiment. Instead, the spatial experience is filtered down to the eye, excluding the rest of the body from fully experiencing the design (Franck and Lepori 2007).

In reality, however, our experience of the built environment is intrinsically multisensory in nature, in the sense that it involves multiple sensory modalities. Fifty years ago, this was already pointed out by Steen Eiler Rasmussen (1959) and Kent Bloomer and Charles Moore (1967). The latters' book *Body, Memory and Architecture* reads as one big plea for architects to design spaces for three-dimensional spatial experience rather

than two-dimensional visual appearance. More recently, Juhani Pallasmaa (2005) drew attention again to the fact that the quality of space, matter and scale is assessed by a combination of multiple senses. The way a space looks is obviously important, but also the way it feels, the smell and sound of a place plays a role in how we experience it (Holl 2005). The latter becomes clear when considering our experience of an urban square, for example. Wei Yang and Jian Kang (2005) pointed out that people's choice to use an urban square is influenced by their preference for certain sounds. Besides graphically representing how a space might look, architects and other designers thus should be able to represent how it will be experienced. Nevertheless, plans, sections and elevations are still considered as suitable for studying the spatial organization of the built environment (Weston 2004), be it drawn with CAD software instead of by hand.

This filtering down of spatial experience to the eye, and the resulting exclusion of the rest of the body, becomes especially clear when confronting architects' designerly ways of knowing with the spatial experience of people who are blind. For this confrontation, we return to the notion of connoisseurship.

4 Blind ways of knowing

4.1 BLINDNESS AS CONNOISSEURSHIP [IN WRITINGS]

Besides by professional activities, the development of connoisseurship may be triggered by other embodied factors, such as cultural elements or—the focus of our research—disability.

Based on his pioneering work with persons living with Alzheimer's and other dementias, John Zeisel (2001) concludes that the perspective and the experience of these people have the potential to complement and enrich the expertise of professional designers. Because the syndrome damages part of the brain that soothes anxiety in strange or unfamiliar settings, these people have been found to have less control over their feelings than cognitively intact people. Thus, Zeisel argues, if one wants to understand what people generally feel in different environments, what better way to do this but to observe people with Alzheimer's in those settings? While one can debate the factors causing this heightened emotional response or lack of self-control, the characteristics of the interaction between people with dementia and the physical environment are clearly intriguing.

Along the same line, Hubert Froyen (2002, 20) suggests: "[w]ho can better clarify for us what the non-visual perceptible multisensory qualities and shortcomings of a city space or of a building are than a blind person?" Indeed, the perspective and experience of persons who are blind may be

considered as representing a specific expertise that may complement the way most architects understand space.

Persons who were born blind or have seen only during a limited period of time, do not have a visual reference system (Warren 1978). This means that they have no visual imagery and, for spatial perception, need to fully rely on information from other senses. Unlike what is oftentimes assumed about blind people, their sense of hearing and touch is not better developed; instead, they are more attentive to non-visual sensory qualities (Warren 1978).

This change in attention is beautifully illustrated in *Leuven Horen en Voelen* (Hearing and Feeling Leuven), a book and CD describing a walk along the historic patrimony of the city of Leuven developed by blind city guide David Mellaerts (2007). Unlike traditional walks in which vision plays a prominent role, Mellaerts' multisensory exploration reveals unexpected dimensions of the city: auditory signals reflect better against high buildings, sound louder in a vaulted space, and spread more easily on a square than in a narrow alleyway; each material has a specific texture and physical qualities: it may feel warm or cold, rough or even, treated in a mechanized or manual way; and every interior space has a specific, characteristic smell, which plays a determining role in its appreciation. Similarly, John Hull (2001) describes how, since he has become blind, the rain allows him to perceive different silent objects from a distance. He hears the rain against the

windows, but also in the driveway, on the bushes, on the street. The rain causes on everything in the environment a slightly different sound.

More in general, Hull (1997) uses the metaphor of a cake to describe how losing his sight altered his perception of the built environment. While initially, lack of vision was experienced as a loss, later it became irrelevant in how he perceives his environment: “One should not think of the life of a blind person as a cake which has had a slice cut out of it. Rather it is like a smaller cake. It is experience as being intact, although the scope of activity has in many ways become smaller” (Hull 1997, xii). Hull’s autobiographical account of becoming blind resonates with growing evidence that spatial experience not only involves *multiple* sensory modalities, but that these sensory modalities *overlap* or *interact* in the bodily interaction with the environment (see *e.g.*, Ingold 2000).

This overlap and interaction between sensory modalities becomes especially clear when considering the haptic sense, which has been found to play a major role in blind people’s spatial experience. The term ‘haptic’ is derived from the Greek ‘haptikos’ (adj.) or ‘haptesthai’ (verb), to lay hold of, and means pertaining to the sense of touch. In relation to architecture, it has a broader meaning than ‘tactile’ in that it involves not only cutaneous perception (touch), but also kinaesthetic perception (positional awareness, balance, movement) (Loomis and Lederman 1986; O’Neill 2001; Herssens 2011). Our footsteps, for example, can provide an impression of the

ground's texture and dimension, but also of our balance and positional awareness. (That is not even to mention the information we can obtain from the sound produced by our shoes.) According to Gunnar Karlsson (1996), the haptic sense can be considered as the most important source of information for blind people.

Everyone experiences space in a multisensory way, yet for most people sight tends to receive more attention than the other senses. As far as persons without sight are concerned, Mellaerts and Hull's examples illustrate how their heightened attention for touch, hearing and smell enables them to detect obstacles but also to appreciate spatial qualities that architects may not be attuned to. Because blind persons and especially persons without residual vision are as it were experts in non-visual sensory perceptions, they seem ideally placed to uncover the multisensory qualities of a building or space.

4.2 BLINDNESS AS CONNOISSEURSHIP [ON SITE]

Having illustrated the spatial experience of persons who are blind as described in writings, we now report on its confrontation with the reality of a specific building. Participatory observation of building visits in the company of blind (or otherwise disabled) persons is one of the approaches we use in our research to gain a better understanding of how these persons experience and appreciate space. During such a visit a particular dialogue develops

between the disabled person on the one hand and the researcher accompanying him/her on the other hand: a dialogue that is embodied in nature, unfolds *in situ*, and involves a particular knowledge transfer (Heylighen and Nijs 2011). Through such a dialogue experience is being framed: both the disabled person and the researcher find themselves in a reflexive stance—reflexive about their experience of the building for the former, reflexive about design practice for the latter.

Other approaches we adopt in our research include using photo ethnography with blind children in a blind institute (Herssens and Heylighen 2012), using video ethnography with blind adults in their home environment (Herssens and Heylighen 2010), conducting focus group interviews with professional caregivers (Herssens 2011), and involving blind people as experts in a design team (Vermeersch, Nijs and Heylighen 2011).

The building visit reported on here took place in a former college from the 16th century, which currently accommodates our university's student services and some student housing. It has been built around two connected courtyards, covered in cobble stones (Figure 1). An arched doorway gives access to the main courtyard (Figure 2), which is surrounded by the knight house in the NE corner and a chapel in the NW corner. An arched gate between chapel and knight house leads to the second courtyard, which has a less public atmosphere than the main courtyard.

A researcher and an architecture student visited the building accompanied by a 68-year old woman who is blind. Within the context of this article, we refer to the woman as Suzanne. During the visit, audio-recordings, pictures and notes were made.

The visit is part of a preparatory study with an eye to making the building better reachable, accessible, usable and understandable to more people. The directorate of the student services, which commissioned the study, assumed that the college's inaccessibility lies in the multiple differences in levels and cobblestones, which are difficult to negotiate for wheelchair users. However, the visit with Suzanne yields a much more nuanced understanding.

The guided tour starts about 200 metres from the site. After being given a short description where to find the college, Suzanne starts to walk. Despite the fact that she is accompanied, she immediately takes her cane because the place is unfamiliar to her and she is aware of the fact that she is expected to find the gate by herself. At first she passes by the entrance without noticing but after being given extra information—referring to the historical architectural characteristics (the pillars) on the footpath—she finds the gate immediately. She encounters one of the pillars with her cane and hears and feels the entrance. If she were to visit the building all by herself, a small mark would enable her to locate the entrance. She proposes to remove one cobble stone or to place a carpet in front of the gate (Figure 3). The fact

that the building is situated on the highest point of the street is imperceptible to her.

When entering the gate Suzanne asks whether the building has a courtyard. At first she passes by the reception, yet as soon as she places a foot on the courtyard, she turns around. The air displacement can already be felt in the passage way, but is more perceptible in the courtyard and helps her to orientate. The reception door is near the entrance (where she would seek intuitively) and betrays a smell that reminds her of libraries and journals (Figure 4).

Receptionist: “Yes?”

Suzanne: “Hello, I’m searching for the job office?”

Receptionist: “The job office….then you have to go to that side [points to the other side of the courtyard] but I will walk with you…”

Suzanne: “…that is not the intention of this, that is not the intention…”

[laughs]

Receptionist: [laughs]

Suzanne: “Can you explain it to me?”

Receptionist: “So over there, you enter the gate…”

Suzanne: “Over there? What do you mean with ‘over there’?”

Receptionist: “On your right side, diagonally…”

Suzanne: “So I go through this side out…?”

Receptionist: “Yes! You walk here outside, you go diagonally to the right.”

Suzanne: “Yes, so I cross the courtyard.”

Receptionist: “Yes you cross the courtyard. In the corner you will find a gate, you enter this gate. A gate made out of stone and 10 meters further on your left and you just walk straightforward. And right in front of you there is a white mansion house with a double door and there you enter, there is the job office.”

Suzanne: “Okay, so I leave this room, I cross diagonally, in the corner on the right the gate”

Receptionist: “Yes you enter the gate.”

Suzanne: “And then to the left.”

Receptionist: “Yes and then straight forward because you walk upon houses, mansion houses, the double door and there is the job office.”

From that point on, the clear explanation of the receptionist enables Suzanne to find any service in the building, she states. Especially the spatial configuration of the ground level seems to be relatively convenient to her and would be easy to remember after, say, two weeks. Later on, when leaving the building, she manages to locate the reception again, based on the sound of traffic on the street and the difference in air displacement (less breeze under the arched doorway).

Unlike the spatial configuration, however, the interior design appears to be very complex which brings on confusion. Layout, materialization and details cause distraction for Suzanne. In the courtyard,

the cobblestones have a tangible texture but this gives no clue without further marks.

Suzanne: “These cobblestones are very difficult, because you easily loose the gutter.”

Student: “And if it were flat you would easily find the gutter?

Suzanne: “Yes yes, but in this case it is very difficult.”

[While following the gutter she runs onto a pick nick table which is placed over the gutter (Figure 5).]

A corridor with a few twists and equipped with fire extinguishers constitutes a true obstacle for Suzanne. Without explanation, finding the door to the ladies’ room in the right wing is highly problematic for her, as it is hidden behind a door which may as well be an office.

Suzanne: “Oops so short [a hallway]…yet …ooh here already? Here already? No.”

Student: “No Suzanne now you are at one side.”

[Suzanne continues walking.]

Student: “No this is the other side!”

[Suzanne turns around and walks to the other side and arrives again at the staircase. Next to the staircase is a small corner with a small door that leads to the restrooms]

Suzanne: “What is this here?”

Student: “Well this is a staircase, but if you feel on your right side you will feel a door.”

Suzanne: “Ooh it is is here….” [enters the restrooms and explores the environment]

Researcher: “Do you think this is clear Suzanne?”

Suzanne: “Yes this is very clear, a very simple toilet…so from wall to wall...”

Researcher: “Was it easy to find the restrooms as well? Here in this building, without explanation?”

Suzanne: “Well without explanation not…without explanation I would not know that I had to come to this place. Moreover, I will not open every door available to see whether I coincidentally find the restrooms, if I don’t smell it.”

Besides the complexity of the layout, Suzanne experiences the interior as too stimulating: too many details to register. Nevertheless she proposes at the end of the guided tour to add more haptic marks for her to remember and distinguish.

Overall, Suzanne characterises the building as a true labyrinth requiring supreme concentration to navigate. Moreover, she has the impression that the atmosphere in the building is highly unpleasant: the

spaces do not smell nor sound well, the ventilation seems inadequate, there is way too much resonance and the spaces feel empty.

4 Discussion

4.1 EXPANDING ARCHITECTS' WAYS OF UNDERSTANDING SPACE

Visiting a building with a person who is blind enables architects to learn about how blind people experience space, but also about how they themselves experience space. Suzanne's understanding and appreciation of the building includes elements that architects may easily overlook or are rather unexpected. Like David Mellaerts and John Hull, she reminds us that our experience of the built environment is intrinsically multisensory in nature. Non-visual qualities like smell, sound, or air quality contribute to how we experience and appreciate a building, including its accessibility and comfort. As the architecture student who accompanied Suzanne puts it: "Her description of architecture is so much different than ours: where we recognize paintings and ornaments on the wall, and thus see a filled up space, she hears an unpleasantly echoing room, which is poorly ventilated and unpleasant to stay in."

These non-visual features are largely absent in traditional design representations. Since architects (like other designers) are found to know, think and work in a visual way, architecture risks to be conceived under consideration of mainly one sense: sight. According to Marta Dischinger

(2006), this absence of non-visual features in design sketches and drawings indicates how they are disregarded as important elements in conceiving space. Similarly, Pallasmaa (2005) argues that this bias towards vision, and the suppression of other senses—in the way architecture is conceived, taught and critiqued—results in a disappearance of sensory qualities in the built environment. While we acknowledge the mediating role of design representations, studies of architects' design processes suggest that these representations rely on the architect/designer using them to reach their full potential (Vermeersch 2013). Moreover, other sensory qualities, such as those related to acoustic comfort, can easily be represented within a designer's graphical toolbox (see *e.g.*, Heylighen, Vermeir & Rychtáriková 2010). In that sense, the fact that architects primarily rely on visual representations does not necessarily imply a reduction in their attention for other sensory qualities.

At the same time, however, the bias towards vision in the way architecture is understood and conceived may point to another reduction. For if the centrality of vision were due merely to an inattention to hearing, touch and smell, then it could be easily corrected by speaking up in praise of the non-visual senses. Yet, as Don Ihde points out, "the situation is complicated by the fact that the reduction *to* vision, in the West, has been accompanied by a second reduction, namely the reduction *of* vision" (Ihde 1976, 21, in Ingold 2000, 282). Because of its alleged characteristics of distance and

directionality, vision is often considered as a sensory modality specialised in the appropriation and manipulation of an objectified world (Ingold 2000, 287). As such it is contrasted with hearing and touch, which are attributed subjective qualities because of their encompassing or proximal nature respectively (Vermeersch 2013, 12). As the accounts of Mellaerts and Hull and the visit with Suzanne demonstrates, however, hearing and touch—and even smell—can be considered as objectifying as much as vision can be considered as subjective. Through touch Mellaerts distinguishes between different materials, the sound of the rain enables Hull to recognize objects at a distance, while the smell of libraries and journals or the difference in air displacement allows Suzanne to locate the reception. These objectifying qualities thus are not inherent to the visual sense. Rather, they are imposed onto it. By consequence, the alleged superiority of vision over other senses—in architectural design, and Western thought at large—is perhaps not so much that of one sense over another, but that of cognition over sensation (Ingold 2000, 255).

It this exactly this superiority of cognition over sensation that is challenged in the notion of expertise as differentiation or connoisseurship. As Tim Ingold (2000, 15) points out, in cognitivist understandings of human cognition, and corresponding notions of expertise, “the body continues to be regarded as nothing more than an input device whose role is to receive information to be ‘processed’ by the mind.” By contrast, the notion of

differentiation or connoisseurship, and the situated understanding of cognition it resonates with, acknowledges that the body itself plays a part in expertise. This notion of expertise offers an excellent vehicle to question architects' designerly ways of knowing space, and to enrich it with blind (or otherwise disabled) persons' multisensory ways of knowing space. To our knowledge, however, so far this notion of expertise has received little attention in design research so far (for an exception, see Suwa 2005).

4.2 DISABILITY AND DIVERSITY

Furthermore, by acknowledging that connoisseurship can be developed through disability, our study advances a rather unusual conception of disability as well. Across the board, conceptions of disability tend to be dominated by a medical discourse, which considers disability as an individual, physiological, disorder to be treated or cured. The disorder is situated in the person and the solution to the problem caused by the disorder lies in treatment or cure to restore the body's function (Corker and Shakespeare 2002). Critiques of such medical conceptions of disability, however, place the body in its socio-material environment by recognizing the complex interplay between features of a person's body and features of the context of his/her actions. For instance, the threshold at which a person considers oneself visually disabled varies across individuals and may also differ from how others perceive them (Butler and Bowlby 1997). Considering disabled people's perspective as a form of connoisseurship goes

even one step further, in that it acknowledges disability's potential to question normative practices and prevailing frames of reference in society (Devlieger, Rusch and Pfeiffer 2003). Ray McDermott and Harvé Varenne (1995) describe this potential of disability as follows: "In cultural terms, the difficulties people in wheelchairs (or city shoppers with carts, etc.) face with curbs and stairs tell us little about the physical conditions requiring wheelchairs or carts, but a great deal about the rigid institutionalization of particular ways of handling gravity and boundaries between street and sidewalk as different zones of social interaction." Similarly, the sensory qualities identified by David Mellaerts, John Hull and Suzanne may tell us little about their own conditions, but a great deal about architects' prevailing way of understanding space and about ways to expand this understanding.

Important to notice in this respect is that we do not claim to have presented in this article *the* way in which blind people experience and understand space, as if 'blind people' could be considered a type or invariant. We are aware that considerable differences may exist between individuals who are blind and the ways in which they experience the built environment and appreciate spatial qualities. These differences may relate to the cause of blindness, the age of onset, the period they have been blind, the presence or absence of residual sight, *etc*. Moreover, even though a blind person may be able to differentiate non-visual qualities in the built environment, this does not necessarily mean that she is able to articulate this

differentiation. Rather our intention was to demonstrate the potential of disability (*c.q.*, blindness) to challenge architects' prevailing ways of understanding space.

Also important to notice is the term 'prevailing' in this context. For in contrasting blind people's expertise with that of architects', we unintentionally might have given the impression that 'architects'—or, more in general, 'designers'—can be considered as a type or invariant as well. In reality, however, significant differences may exist between individual architects' and the ways in which they understand and conceive space (see *e.g.*, Lawson 1994 for an in-depth comparison of 11 architects' ways of designing) and, moreover, the architect is but one component of the 'messy reality of design' (Cuff 1992; Imrie & Street 2011). At the same time, recent developments towards more human-centred and inclusive design approaches seem very promising in terms of addressing issues raised in this article, limited as their uptake in architectural practice may be so far.

4.23 RELEVANCE FOR URBAN DESIGN

While in this article we have focused on design in architecture, the underlying rationale may be relevant for other design domains with an interest in the urban environment as well: professionals and researchers in urban design, civil and traffic engineering, town and transport planning, product and industrial design all may be invited by disability (*c.q.*, blindness) to perceive and understand the urban environment in novel ways.

To substantiate this point, we refer, by way of example, to the work of Reid Ewing and Susan Handy (2009), who try to measure urban design qualities related to walkability in order to inform urban design practice (see also Ewing *et al.* 2006). The study is based on visual assessment methods, whereby video clips of commercial streetscapes were used for rating urban design qualities. These assessments were carried out by an expert panel of 10 urban design and planning experts rather than street users because, the authors write "the concepts the study ought to operationalize are not familiar to the average person" (Ewing and Handy 2009, 68). Using ratings from this expert panel, the authors were able to measure five urban design qualities in terms of physical features, derived from earlier visual assessment studies and interviews with the expert panel. These urban design qualities are imageability, enclosure, human scape, transparency and complexity. In the context of this article, at least two aspects of this study deserve our attention. First, despite the outspoken bodily nature of walking, the study uses video clips instead of field visits as a medium to assess the walkability of streetscapes. While visual features (*e.g.*, building silhouettes, sight lines, colours) and auditory ones (*e.g.*, noise level) can be captured by video clips to some extent, haptic features (*e.g.*, the difficulty of walking over cobble stones, differences in air displacement) or olfactory ones (*e.g.*, the smell of libraries and journals) can certainly not. Second, the assessment is made by professional experts, whereas those affected by it—people who regularly

walk the streets considered—are left as seemingly incapable of joining the dialogue because their bodily experience apparently is not considered as expertise in the field (see also Heylighen and Nijs 2011).

That is not to say that the urban design literature entirely ignores the importance of non-visual sensory qualities or the role of the body in how we experience urban space. A case in point is Rob Imrie's (2012) study of shared space, a traffic engineering concept that eliminates physical barriers separating pedestrians and other road users to encourage a sharing of street space. While such sharing is considered as a means to create convivial urban spaces, Imrie's interviews with vulnerable street users, including vision impaired people, indicate that they perceive shared space as compromising their safety and well-being. Underlying its design is the assumption that all street users are able to negotiate their access to and use of space, yet the interviews suggest otherwise. In the absence of signs and signals, negotiation of movement heavily depends on eye contact and visual interaction between car drivers and pedestrians or other road users. This mode of negotiation may be problematic for vision impaired people, but also for older people suffering from eyesight problems, or for people who are blinded by the sun or otherwise distracted. As such, Imrie (2012, 2260) suggests, the perspective of vision impaired persons unmasks shared space "as 'disembodied urban design' that fails to capture the complexity of corporeal form and the manifold interactions of bodies-in-space".

Motivated by this critique, Victoria Hammond and Charles Musselwhite (2013) set out to address the lack of evidence underpinning the concept and design of shared space, in terms of attitudes and usability, particularly for vulnerable road users. To this end, mobility or vision impaired people and older people were invited to walk or ride the entire length of a route through a shared space, while a researcher observed their behaviour and made notes, and subsequently to participate in a focus group. Findings suggest that it is not shared space per se that might stop vulnerable pedestrians from using space, but nuances of design which can be changed as appropriate. For instance, the elimination of the kerb in shared space has been cited as problematic for pedestrians using a long-cane or guide dog for navigation. By contrast, vision impaired participants in this study suggested to replace a kerb by a tactile edge. Rather than studying shared space as a concept that is more or less successful, Hammond and Musselwhite (2013) therefore conclude, a variety of schemes need to be considered, and vulnerable street users like vision impaired people need to be involved throughout the development and implementation of shared spaces. As such this study acknowledges the bodily experience of being disabled (*c.q.*, vision impaired) as a form of expertise that may benefit the understanding and design of the urban environment, both in its methodology and in its conclusion.

5 Conclusion

In establishing the strengths and weaknesses in the design expertise of architects and other designers, we have argued in this article that their predominantly visual way of knowing space may as well be regarded as a form of *not* knowing—of disregarding the bodily experience of the built environment. This disregard becomes especially clear when confronting architects' way of knowing space with the spatial experience of persons who are blind. From their perspective, architects are said to be designing in the dark in the sense that they increasingly emphasize the visual, and are insufficiently familiar with the multisensory richness of beneficent built environments (Dujardin 2009). Rather than favouring one sense over another, however, we would argue that this emphasis risks to downplay the role of the body in how space is understood and conceived. The discrepancy between these two ways of knowing space—architects' 'visual' way and blind people's embodied way—illustrates what Ray McDermott and Hervé Varenne (1995) call the power of society to disable. However, it can also be considered as an invitation to designers to question the frames of reference underlying the way they tend to understand and conceive space.

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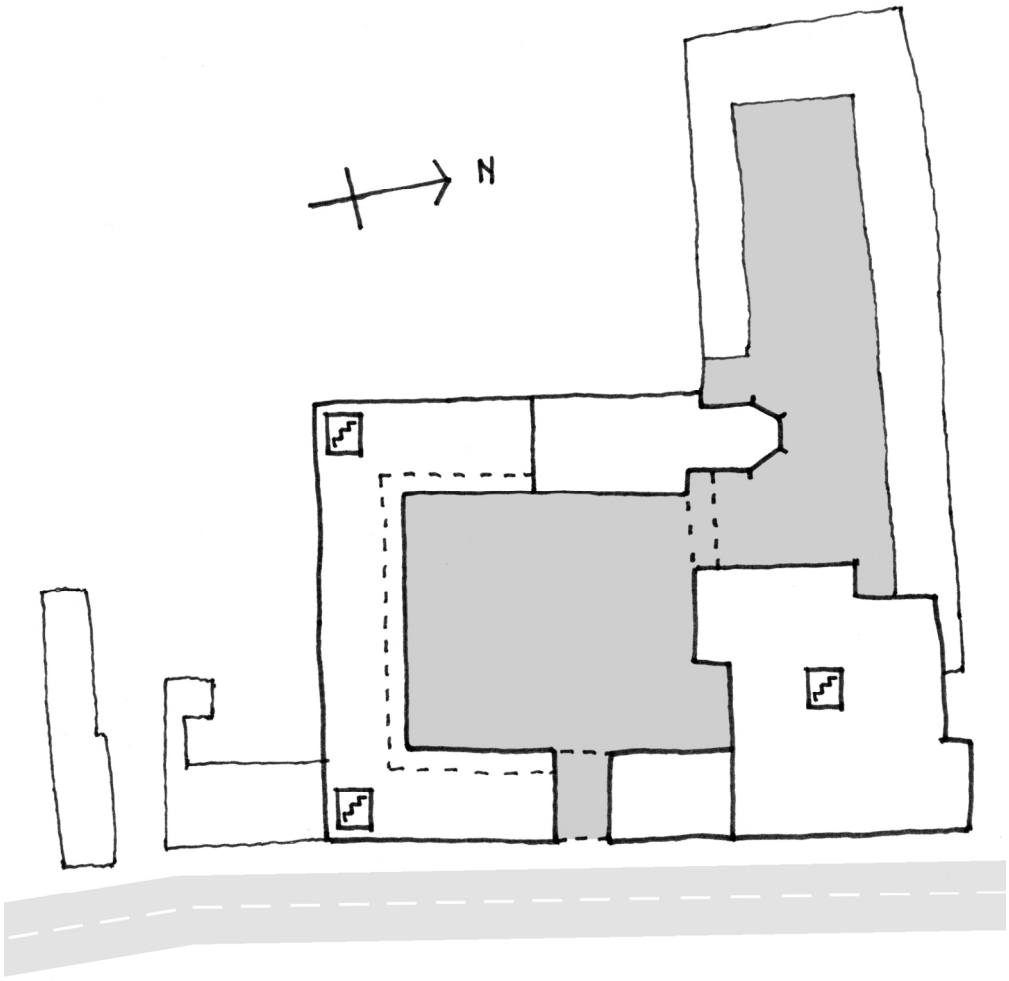

Figure 1: Layout of the college: 1 arched doorway, 2 knight house, 3 chapel, 4 U-shaped building, 5 auxiliary buildings (drawing: omitted for blind review).
145x146mm (300 x 300 DPI)

Figure 2: View on the courtyard from the arched doorway (photo: omitted for blind review).
169x254mm (300 x 300 DPI)

Figure 3. Suzanne next to the pillar, which allowed her to find the gate. By way of 'landmark', she proposes to remove one cobble stone or to place a carpet in front of the gate (photo: omitted for blind review).
342x257mm (180 x 180 DPI)

Figure 4: Suzanne with the student next to the door of the reception (photo: Author 2).
195x146mm (300 x 300 DPI)

Figure 5: While following the gutter Suzanne runs onto a pick nick table which is placed over it (photo: omitted for blind review).
101x101mm (300 x 300 DPI)